

Fuel Price Synthesis: Determining Current and Future Gas Prices

With the recent rise in gas prices, there is much debate over how to forecast future price changes. On the email list, this is a protracted issue with discussion going back as far as the inception of the Travel Model Improvement Program (TMIP) email list community. In November, 2001 an inquiry to the email list attempting to determine acceptable fuel cost ranges for a 2025 forecast scenario stimulated a discussion regarding changes to fuel prices and accounting for these changes within travel demand models (TDMs). Initially, many of the responses offered suggestions, methodologies and approaches for specifically forecasting fuel price and the subsequent influence on auto operating costs. The discussion has evolved through the years and has been expanded to include a number of considerations other than simply estimating future fuel costs. A significant amount of contributions have revolved around the potential changes, approaches and considerations that should be given to fuel price changes and the influences these may have on trip generation, trip distribution and mode choice models. A parallel discussion thread regarding model uncertainties, model sensitivities and elasticity's also surfaced.

The following synthesis represents discussions and contributions regarding potential methodologies and approaches to forecasting gas prices and represents a synthesis of all contributions to the email list community since it's inception regarding this particular subject matter. This technical synthesis will be presented in three main categories: methodologies and approaches (current and future gas prices), issues and comments, and conclusions based on the composite of all contributions to the email list.

Methodologies and Approaches

Three methods for determining the current price of gas as well as numerous approaches to forecasting the price of gas were made to the email list in response to the initial inquiry into forecasting gas prices and auto operating costs. Below are highlights from the contributions to the email list for determining a current base year value as well as approaches to forecasting the cost of fuel:

- *Current Year:*
 - Use the Bureau of Labor Statistics (BLS) to determine current average price data by region and for the country.
 - Determine the average price of gasoline over a period of time (e.g. 5, 10, 15, 20 years) to determine a current value.
 - Access information available on the internet to determine the current and/or historical price of gas for your region or the country. A number of contributors noted several sites that offer current information on the price of gasoline.
- *Future Year(s):*
 - Apply the Delphi approach, which essentially relies on a panel of experts to prepare future year(s) estimates.
 - Adopt an approach that adjusts the price of gasoline faster or slower than the rate of inflation.
 - Apply linear regression (historical trend analysis) over a period of time to project future values.
 - Employ sophisticated economic forecast methods, such as time-series models, single equations from multiple regressions, and multiple equation regression equations.
 - Use the base year fuel cost and assume that the relative value remains the same in constant dollars.

Issues and Comments

Along with suggested methods or approaches, a number of contributors offered corresponding issues associated with determining the current and future price of gas. Some methods, such as using the internet or BLS data are self-explanatory. While other approaches, such as trending past gasoline prices to determine a current average price of gas as well as a future value(s), came with cautionary comments. Below are the highlights of the comments provided for certain approaches or methods:

- *Apply the Delphi approach:* As one contributor noted, the disadvantage with this approach is the estimate(s) may not be delivered in a timely enough fashion since a consensus needs to be achieved.
- *Forecast the price of gas either slower or faster than the inflationary rate:* Based on contributions to the email list, all costs in the base year are typically expressed in terms of constant dollars and it is assumed that the relative price of gasoline will remain the same in the forecast. Two contributors noted that any discussion regarding behavioral changes as a result of future year price increases should try to determine if the change is a result of the price increase exceeding the region's real-dollar wages or the Consumer Price Index (CPI). As one contributor to the discussion observed, the challenge is one of determining if auto operating costs as well as other costs (parking, transit fares, value of time) will be growing faster or slower than inflation, which is typically identified as the CPI. If the auto operating cost does not coincide with inflation, then an important element in maintaining consistency is to determine the potential impacts to the other costs as well.
- *Apply a linear regression:* A number of participants warned against using short-term trends to extrapolate or project future values. As noted by one contributor, trending fuel prices is difficult at best since the real price of gasoline trended downward until very recently (i.e. the past six years).
- *Employ sophisticated economic models:* One contributor felt that forecasting gas prices is essentially impossible by any available method because of the historical counter-trends between the real and nominal price of gas as well as the uncertain nature of world events. Similarly, another participant noted the difficulty associated with this endeavor because of all of the underlying factors that affect the price of gasoline, such as supply and demand, adoption of new technologies in the vehicle fleet, and government policies.
- *Use the base year value expressed in constant dollars:* Based on numerous postings, this appears to be the most widely adopted and accepted practice. As noted, this approach uses a base year value that is easily explained and defended. It was also noted that other methods may be too speculative when forecasting the price of gasoline because so many other events contribute to the actual price (world demand for oil, geo-political conflicts, and government policy).

Conclusions

A few of the email list comments conclude that it is generally recommended that each methodology and assumption be confirmed and agreed to during the planning process either through a technical working group or peer review committee. As one participant noted, developing a value based on the contributions of a technical working group or peer review committee doesn't necessarily contribute to better data but improves the understanding of the complexities involved in the issues being addressed and everyone understands how the value was generated. The general consensus is to assume the relative price of gas (as expressed in base year constant dollars) remains the same in the forecast. By doing so, the value can be defended, whereas forecasting the price of fuel is merely an exercise in speculation.

DISCLAIMER

The objective of the series is to provide technical syntheses of current discussion topics generating significant interest on the TMIP e-mail list. Each synthesis is drawn from e-mails posted to the TMIP email list regarding a specific topic. The syntheses are intended to capture and organize worthwhile thoughts and discussions into one concise document. They do not represent the opinions of FHWA and do not constitute an endorsement, recommendation or specification by FHWA. These syntheses do not determine or advocate a policy decision/directive or make specific recommendations regarding future research initiatives. The syntheses are based solely on comments posted to the e-mail list.